

## Plantae Chinenses Forrestianae.

Plants discovered and collected by George Forrest during his first exploration of Yunnan and Eastern Tibet in the years 1904, 1905, 1906.

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### Enumeration and Description of Species of Pedicularis.

BY

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Lure.

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With Plates LXX.-LXXV.

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#### SECT. I. SIPHONANTHAE.

1. *Pedicularis labellata*, Jacquem. ex Decne, in Voy. Jacquem. Bot., p. 118, t. 123.

"Pass between Teng Chuan and Sung Kwei valleys. Moist, rocky places. Alt. 9-10,000 ft. Flowers crimson. September 1904." G. Forrest. No. 1130.

"Marshy ground, margins of lake north of Chung Tien. Alt. 13,000 ft. 1904." G. Forrest. No. 1131.

2. *Pedicularis longiflora*, Rudolph., in Mém. Acad. St. Petersb. iv, p. 345, t. 3; Maxim. Mém. Biol. x, p. 86.

"Marshy ground on borders of a large lake 8 to 9 miles north of Chung Tien. Alt. 11,800 ft. Flowers bright orange. September 1904." G. Forrest. No. 1132.

3. *Pedicularis siphonantha*, Don. Prodr. Fl. Nepal., p. 95.

"Marshy ground on borders of a large lake north of Chung Tien. Alt. 11,800 ft. Flowers red. September 1904." G. Forrest. No. 1133.

[Notes, R.B.G., Edin., No. XXIII., December 1911.]

"Plant of 3-7 inches. Flowers bright rose-crimson. Moist, rocky mountain meadows on the eastern flank of the Tali Range. Lat.  $25^{\circ} 40'$ . Alt. 11-12,000 ft. September 1906." G. Forrest. No. 5078.

4. *Pedicularis Delavayi*, Franch. ex Maxim., in Mél. Biol. xii, p. 897.

"Plant of 4-6 inches. Flowers bright magenta-rose and white. Open mountain pastureland on the eastern flank of the Lichiang Range. Lat.  $27^{\circ} 25' N$ . Alt. 11-12,000 ft. July 1906." G. Forrest. No. 2638.

5. *Pedicularis oxycarpa*, Franch. ex Maxim., in Mél. Biol. xii, p. 804, fig. 19.

"Plant of 8-14 inches. Flowers rose and white. Open, grassy situations in pine forests on the eastern flank of the Lichiang Range. Lat.  $27^{\circ} 25' N$ . Alt. 10,500-11,000 ft. June 1906." G. Forrest. No. 2450.

6. *Pedicularis cephalantha*, Franch. ex Maxim., in Mél. Biol. xii, p. 805, fig. 20.

"Plant of 6-10 inches. Flowers deep rich rose. Grassy, rocky slopes on the eastern flank of the Lichiang Range. Lat.  $27^{\circ} 15' N$ . Alt. 11-12,000 ft. July 1906." G. Forrest. No. 2547.

7. *Pedicularis longipetiolata*, Franch. ex Maxim., in Mél. Biol. xii, p. 806.

"Plant of 10-15 inches. Flowers bright rose. Open mountain meadows on the eastern flank of the Lichiang Range. Lat.  $27^{\circ} 25'$ . Alt. 11-12,000 ft. September 1906." G. Forrest. No. 3059.

8. *Pedicularis polyphylla*, Franch. ex Maxim., in Mél. Biol. xii, p. 809, fig. 16.

"Plant of 12-16 inches. Flowers rose. Dry, rocky pastureland on the eastern flank of the Tali Range. Lat.  $25^{\circ} 40'$ . Alt. 9-10,000 ft. June-July 1906." G. Forrest. No. 4493.

var. *pilosa*, Bonati. Var. nov.

Tota pilis rufis lanuginoso-pilosa.

"Procumbent plant of 1-2 ft. Flowers magenta-rose.

Open, grassy situations amongst scrub on the eastern flank of the Lichiang Range. Lat.  $27^{\circ} 15'$ . Alt. 10-11,000 ft. July 1906." G. Forrest. No. 2640.

9. *Pedicularis gruina*, Franch. ex Maxim., in Mém. Biol. xii, p. 799, fig. 15.

"Plant of 6-9 inches. Flowers dull crimson. Rocky, grassy situations amongst scrub on the eastern flank of the Lichiang Range. Lat.  $27^{\circ} 15'$ . Alt. 10-10,500 ft. August 1906." G. Forrest. No. 2725.

"Moist places in most valleys north of Talifu. Alt. 7-11,000 ft." G. Forrest. No. 1134.

10. *Pedicularis Margaritae*, Bonati. Sp. nov. Plate lxx.

Radix ? Caulis ascendens, flexuosus, 45 cm. ac ultra longus, pilis albis lanuginosis praesertim summo tectus, ramosus, ramis ascendentibus. Folia radicalia ? Folia caulina alterna, petiolata, petiolis 10-20 mm. longis, membranaceis ac alatis; limbo 2-4.5 cm. longo, 2 cm. lato, bipinnatilobato, lobis obtusis, lobulis dentatis; bracteae foliaceae, petiolis 10-20 mm., membranaceis, per lucidis, limbo 6-8 mm. longo, lobis 3-5 sparsis. Flores axillares. pauci, pedunculati, pedunculis 5-10 mm. longis, erectis, pilosis, Calyx membranaceus, cylindricus, 6-8 mm. longus, anticem usque ad medium fissus, lobis 5 subaequalibus, pinguibus, flabellatis, plus minusve dentatis. Corolla rosea tubo glabro, calyce duplo longiore; galea rectangulatum curvata, in parte inferiori circiter 6 mm. longa, erecta; in horizontali 3 mm. longa, abrupte in rostrum filiformem, 4-5 mm. longum, rectum vel vix incurvatum, contracta; margine inferiori addita ad faucem lateraliter dente vix distincta; dorso rotundo, villosa; labio inferiore superius aequante; lobo medio lateralibus minore, margine glabra. Stamina in medio tubi inserta; filamentis omnibus villosis. Capsula ac semina ?

"Plant of 1-1½ ft. Flowers rose. Open, grassy situations amongst scrub on the eastern flank of the Tali Range. Lat.  $25^{\circ} 40'$ . Alt. 9-10,000 ft. June-July 1906." G. Forrest. No. 4504.

This plant seems to be intermediate between *P. cephalantha*, Franch., of which it has the helmet suddenly contracted into a long beak, and *P. longipetiolata*, Franch., which it resembles in habit.

It differs from *P. cephalantha*, Franch., by :—

1. Its habit is quite different; its inflorescence is much looser; the whole plant is covered by white woolly hairs.

2. Its leaves, even the lower ones, are never pinnatisect.
  3. Its bracts are widened at the base and long-petiolate; its peduncles are longer; the calyx is very hairy and its teeth are toothed.
  4. All the filaments are hairy.
- It differs from *P. longipetiolata*, Franch., by:—
1. Its hairiness and its leaves are not pinnatisect.
  2. Its helmet is suddenly contracted into a beak and pilose at the back.
  3. The teeth of the edge of the helmet are obsolete.
  4. All the filaments are hairy.
  5. Its corolla is shorter, as is the calyx.

*P. oligantha*, Franch., of the same affinity and the same region, is glabrous; its calyx has only 2-3 teeth, the tube of its corolla is not longer than the calyx, the back of its helmet is glabrous; the teeth of the edge are very prominent; the lower lip is fimbriate; the filaments are glabrous.

## SECT. II. ORTHORRHYNCHAE.

11. *Pedicularis axillaris*, Franch. ex Maxim., in Mél. Biol. xii, p. 825, fig. 39.

"Plant of 4-6 inches. Flowers rose. Moist pastureland on the eastern flank of the Tali Range. Lat. 25° 40' N. Alt. 7-9000 ft. May-June 1906." G. Forrest. No. 4485.

"Procumbent plant of 1-2 ft. Flowers bright rose-red. Moist, shady situations in mixed and pine forests on the eastern flank of the Lichiang Range. Lat. 27° 15' N. Alt. 10-11,000 ft. July 1906." G. Forrest. No. 2628.

12. *Pedicularis Balfouriana*, Bonati. Sp. nov. Plate lxxi.

Species perennis, multicaulis; collo radice inflato, cum fibris filiformibus elongatis; caulibus erectis vel patulo-diffusis, 12-15 cm. longis, simplicibus, angulosis, glabris vel in sulcis ciliatis, paucifoliatis. Folia glabra; radicalia opposita, petiolis planis, alatis, 3-4 cm. longis, limbo ovato-elongato, 7-8 cm. longo bipinnatisecto, segmentorum 8-10 jugis quorum inferiora parva, petiolulata ac valde distantia, superiora linearia, 10-15 mm. longa, 2-3 mm. lata, sessilia; lobulis obtusis, integris vel obtuse dentatis, sessilibus, 4-7 jugis. Bractee ac folia caulinarum foliis radicalibus similes, brevius petiolatae. Flores omnes axillares, pedunculati, pedunculis erectis, 7-22 mm. longis. Calyx campanulatus, tubo glabro, 4-5 mm. longo, dentibus

5, 2-3 mm. longis, basi anguste linearibus, summo dilatatis ac inciso-foliaceis, margine ciliatis. Corolla viridulo-alba 8 mm. longa, tubo cylindrico, 8-10 mm. longo, calycem circiter duplo-superante; galea rectangularata, in parte erecta tubum aequans, in horizontali 4-5 mm. longa, attenuata in rostrum linearem, 5-6 mm. longum, rectum vel vix incurvatum, summo emarginatum; margine inferiore galea aliâ et alterâ parte obtuse gibbosa; labio inferiore superius aequante vel vix superante, margine pilis raris ac longis ciliata; lobis vix inaequalibus. Stamina tertio inferiore tubi inserta; filamentis omnibus glabris. Capsula ac semina?

"Plant of 6-8 inches. Flowers greenish-white. Open, stony pastureland on the eastern flank of the Tali Range. Lat. 25° 40' N. Alt. 9-10,000 ft. June 1906." G. Forrest. No. 4489.

The nearest form is *P. axillaris*, Franch., from which the new species differs by its habit, the shape of the leaves, the colour of the corolla; the petioles and peduncles are much longer.

13. *Pedicularis alopecuros*, Franch. ex Maxim., in Mél. Biol. xii, p. 816, fig. 33.

"Plant of 1-2 ft. Flowers canary yellow, upper segment rose. Moist, shady situations amongst grass along the base of the eastern flank of the Lichiang Range. Lat. 27° 10' N. Alt. 8500-9000 ft. July 1906." G. Forrest. No. 2649.

"Dry, shady, grassy situations in pine and mixed forests on the eastern flank of the Lichiang Range. Lat. 27° 20' N. Alt. 9-10,000 ft. September 1906." G. Forrest. No. 2945.

14. *Pedicularis gyrorhyncha*, Franch. ex Maxim., in Mél. Biol. xii, p. 812, fig. 24.

"Plant of 1-4½ ft. Flowers yellow. Common in most marshy woods up to an elevation of 9000 ft." September 1904. G. Forrest. No. 1135.

"Plant of 1½-2 ft. Flowers pale rose. Grassy openings in pine forests on the eastern flank of the Lichiang Range. Lat. 27° 25' N. Alt. 10-11,000 ft. September 1906." G. Forrest. No. 2944.

15. *Pedicularis Smithiana*, Bonati. Sp. nov. Plate lxxii.

Multicaulis, radice fibrosa; fibris multis elongatis, linearibus vel vix inflatis. Caules 25-45 cm. alti, simplices, erecti, angulosi, in sulcis villosi, alio glabri. Folia radicalia caduca; caulinarum

pubescentia, 4-verticillata, in verticillis paucis ac distantibus, petiolata; petiolis 2-3 cm. longis, alatis; limbo 25-40 mm. longo, ovato-acuto, pinnatifido, loborum 3-9 jugis, lobis lineato-obtusis, irregulariter incisis. Folia superiora caulinaribus similia, petiolis brevibus, villosissimis. Bracteae inferiores, foliaceae. sessiles, flores superantes; superiores membranaceae, integrae, lineares, basi dilatatae, sessiles ac margine ciliatae. Flores axillares, sessiles, 4-verticillati, in spicam terminalem densam. Calyx 6-8 mm. longus, tubo membranaceo, perlucido, inflato, cum nervis 10 eminentibus ac villosis; dentibus 5, media brevior, lanceolato-acuta, integra; lateralibus summo acutidentatis, aliquando 2-3 lobatis. Corolla dilute lutea, tubo calycem vix superante, 8 mm. longo; galea rectangulata, in parte verticali 4-5 mm. longa, in horizontali 3 mm., abrupte contracta in rostrum subfiliformem, gracilem, curvatum, saepe summo erectum; labio inferiore superius aequante, margine glabro, trifido, lobis lateralibus ovato-obtusis, medio angustiore. Stamina tertio superiore tubi inserta; filamentis omnibus glabris. Capsula ac semina?

"Plant of 6-15 inches. Flowers dull yellow. Shady, grassy situations in the margins of pine forests on the eastern flank of the Lichiang Range. Lat. 27° 20' N. Alt. 10,500-11,500 ft. August 1906." G. Forrest. No. 2860.

16. *Pedicularis gracilis*, Wall. ex Benth., Scroph. Ind., p. 52; Maxim., in Mél. Biol. xii, p. 822.

"Plant of 1½-2½ ft. Flowers rose. Amongst rhododendron scrub on the eastern flank of the Tali Range. Lat. 25° 40'. Alt. 9-10,000 ft. July 1906." G. Forrest. No. 4496.

17. *Pedicularis tantalorhyncha* (Franch. msc.) Bonati.

"Plant of 4-8 inches. Flowers rose. Shady situations in side valleys on the eastern flank of the Tali Range. Lat. 25° 40' N. Alt. 10,000 ft. July 1906." G. Forrest. No. 4497.

18. *Pedicularis debilis*, Franch. ex Maxim., in Mél. Biol. xii, p. 817.

"Plant of 2-3 inches. Flowers rose. Boggy pastureland by the sides of streams on the eastern flank of the Tali Range. Lat. 25° 40'. Alt. 9000 ft. June 1906." G. Forrest. No. 4491, partly.



19. *Pedicularis porrecta*, Wall. Cat. n. 423 (*P. leiandra*, Franch. ?).

"Plant of 9-18 inches. Flowers rose. Grassy situations on the margins of mixed forests on the eastern flank of the Tali Range. Lat. 25° 40' N. Alt. 8-9000 ft. June 1906." G. Forrest. No. 4492.

### SECT. III. RHYNCHOLOPHAE ALTERNIFOLIAE.

20. *Pedicularis Viali*, Franch., in Journ. Linn. Soc. xxvi, p. 219.

"Plant of 2-4 ft. Flowers rose. Shady situations in pine forests on the eastern flank of the Tali Range. Lat. 25° 40' N. Alt. 10-11,000 ft. July-August 1906." G. Forrest. No. 4498.

21. *Pedicularis tenuisecta*, Franch. ex Maxim., in Mél. Biol. xii, p. 831, fig. 46.

"Plant of 12-18 inches. Lower lobe of corolla light-rose, upper, deep-rose."

"Dry, rocky situations amongst scrub on the eastern flank of the Lichiang Range. Lat. 27° 20' N. Alt. 9500-10,500 ft. July 1906." G. Forrest. No. 2785.

"Amongst scrub in side valleys on the eastern flank of the Tali Range. Lat. 23° 40' N. Alt. 9-10,000 ft. June 1906." G. Forrest. No. 4495.

22. *Pedicularis veronicaefolia*, Franch., in Bull. Soc. Bot. Fr. xlvii, p. 30.

"Plant of 6-14 inches. Flowers deep rose-crimson. Stony mountain pasture on the eastern flank of the Tali Range. Lat. 25° 40' N. Alt. 9-11,000 ft. July-August 1906." G. Forrest. No. 4676.

This is a more hairy form, with filaments slightly bearded at the base and larger flowers.

23. *Pedicularis crenata*, Maxim., in Mél. Biol. xii, p. 832, fig. 53.

"Plant of 5-9 inches. Flowers deep rose. Open, moist situations amongst rocks in side valleys on the eastern flank of the Lichiang Range. Lat. 27° 25'. Alt. 12-13,000 ft. October 1906." G. Forrest. No. 3079.

24. *Pedicularis yunnanensis*, Franch. ex Maxim., in Mél. Biol. xii, p. 851.

"Plant of 6-8 inches. Flowers rose. Mountain meadows on the eastern flank of the Tali Range. Lat.  $25^{\circ} 40'$  N. Alt. 10-12,000 ft. July-August 1906." G. Forrest. No. 4499.

25. *Pedicularis tsangchanensis*, Franch. ex Maxim., in Mél. Biol. xii, p. 850.

"Plant of 4-6 inches. Flowers rose. Ledges of cliffs and on humus-covered boulders in side valleys on the eastern flank of the Tali Range. Lat.  $25^{\circ} 40'$  N. Alt. 9-11,000 ft. June-August 1906." G. Forrest. No. 4501.

26. *Pedicularis filicula*, Franch. ex Maxim., in Mél. Biol. xii, p. 853.

"Plant of 4-6 inches. Flowers deep crimson. Rocky grassy slopes on the eastern flank of the Lichiang Range. Lat.  $27^{\circ} 12'$  N. Alt. 11-12,000 ft. June 1906." G. Forrest. No. 2420.

27. *Pedicularis Forrestiana*, Bonati. Sp. nov. Plate lxxiii.

Radix pinguis, horizontalis, fibris linearibus, elongatis, addita. Caules multi, adscendentes vel erecti, 15-20 cm. alti, basi cylindrici, summo angulosi, pubescentes, simplices. Folia radicalia multa, longe petiolata; petiolis 5-6 cm. longis, alatis ac pilis rufis vel albidis ciliatis; limbo 3-5 cm. longo, 1-2 cm. lato, petiolo decurrenti, lineato-oblongo, pinnatilobato, loborum 8-10 jugis, 4-6 mm. longis, 2-4 mm. latis, obtusis, plus minusve incisis, dentibus acutis vel obtusis. Folia caulinarum ac bracteae radicalibus similia, sed minora ac brevius petiolata. Flores axillares, distantes, pedunculis gracilibus, erectis, glabris, 5-8 mm. longis. Tubus calycis cylindricus, glaber, 7-8 mm. longus; lobis 5, sessilibus, flabellatis, acutidentatis, 1-2 mm. longis. Corolla rosea; tubo calycem duplo-superante, summo dilatato; galea rotunda, in parte erecta 4-5 mm. longa, in horizontali 5-6 mm., dorso cristata ac saepe paulo villosa, margine glabra ac latere dentata, dentibus porrectis ac ad faucem reflexis; galea rostro falcato, lente attenuato, summo integro, 5 mm. longo, obliquo; labio inferiore superius aequante, superficialiter trilobato; lobo medio lateralibus minore, vix prominente, cucullato; margine dense ciliato. Stamina tertio inferiore tubi inserta; filamentis paulo villosis. Capsula ac semina?

"Plant of 6-9 inches. Flowers bright rose-red. Dry, open situations on limestone drift at base of cliffs on the eastern



flank of the Lichiang Range. Lat. 27° 25' N. Alt. 11-12,000 ft. August 1906." G. Forrest. No. 2703.

This plant is allied to *P. tsangchanensis*, Franch., but very different from it in the shape of the lower lip bearded at the edge, and in the stamens slightly hairy.

28. *Pedicularis taliensis*, Bonati. Sp. nov. Plate lxxiv.  
(*Tristes*).

Radix fibrosa. Uni-vel pluricaulis. Caules erecti, 15-20 cm. alti, e basi ramosi, ramis erectis vel paulo divergentibus, angulosi, glabri vel in sulcis solum villosi. Folia radicalia caduca; caulinaria glabra, alterna, petiolata (petiolis 4-10 mm. longis), limbo ovato-obtusum, circiter 2 cm. longo, 15 mm. lato, pinnatisecto, segmentorum sessilium 3-5 jugis, distantibus, lineato-oblongis, pinnatilobulatis, lobulis obtusis; folia superiora caulinaribus similia sed breviora. Bractee foliaceae, petiolulatae. Flores axillares, soli, valde distantes, breve pedunculati, erecti; pedunculis 1-2 mm. longis. Calyx minimus, 3-4 mm., campanulatus; tubo membranaceo perlucido, piloso, nervis eminentibus, summo truncato, 5-7 dentibus integris, acutis, minimis, prope nullis. Corolla dilute rosea, tubo calycem aequante vel paulo superante, summo dilatato; galea dorso villosa, rectangulatim curvata, in parte erecta 5 mm. longa, in horizontali brevior, in rostrum conicum, brevissimum, erectum ac summo emarginatum, paulatim attenuata; labio inferiore superius aequante, margine longe ciliato, lobo medio proeminente, ovato-obtusum, latiore quam longo, lateralibus multo brevioribus. Stamina medio tubi inserta; filamentis paulo villosis. Capsula calyce 2-vel 2.5-plo longior, prismatica, summo oblique truncato. Semina?

"Plant of 4-10 inches. Flowers pale rose. Grassy situations on the margins of pine forests on the eastern flank of the Tali Range. Lat. 25° 40' N. Alt. 9-11,000 ft. July-August 1906." G. Forrest. No. 4500.

In habit and leaves this species refers *P. tibetica*, Franch., and *P. Souliei*, Franch.; it is distinguished, however, by its nearly sessile flowers, the short beak, the short hairy helmet, and, especially, by the shape of the calyx.

29. *Pedicularis Stadlmanniana*, Bonati. Sp. nov. Plate lxxv. (*Tristes*).

Species diffusa, multicaulis; radix fibrosa, pilis rufis vel albidis tecta. Caulis centralis erectus, 6-10 cm. altus, e basi ramosus; caules ac racemi laterales patuli, repentes, 10 cm.

ac ultra longi, saepe simplices. Folia radicalia caduca, caulinarialia alterna, petiolata; petiolis 10-15 mm. longis, alatis, ac pilis longis, rufis, dense ciliatis; limbo ovato-obtusum, 15-20 mm. longo ac lato, pinnato, loborum 4-5 jugis; lobis inferioribus deltoideis, superioribus linearibus, obtusis, acutidentatis. Bracteae foliis similes. Flores axillares, pedunculis 5-20 mm. longis, erectis. Calyx campanulatus, anticem usque ad medium fissus ac subspathiformis; tubo membranaceo, perlucido, nervis 5 eminentibus, plus minusve reticulatis ac pilis albis pluricellularibus tectis; lobis 5 inaequalibus, pedicellatis, summo foliaceis, triangulato-acutis, summo generaliter additis pilis 2, albis, brevibus, rigidis, divergentibus. Corolla dilute rosea, tubo 7-8 mm. longo, calycem aequante vel paulo superante, lato, summo dilatato; galea tubum aequans, rectangulata, dorso rotundo ac piloso, praesertim anticem, abrupte in rostrum rectum vel vix incurvatum, glabrum, 7 mm. longum, summo breve bifidum, contracta; margine inferiori glabra ac fauce dente una addita; labio inferiore alterum superante, margine ciliato; lobo medio lateralibus brevior ac angustior. Stamina medio tubi inserta, filamentis omnibus villosis, duobus anterioribus densius.

"Plant of 2-8 inches. Flowers pale rose. Grassy openings in pine forests on the eastern flank of the Tali Range. Lat. 25° 40' N. Alt. 8-10,000 ft. July 1906." G. Forrest. No. 4488.

This is very like *P. grüna* var. *cinerascens*, but easily recognised by the calyx split and the helmet being hairy at the back. By this latter character it approaches *P. cephalantha*, Franch., but it differs from that species by the habit and the tube of corolla hardly longer than the calyx and widened at the summit.

30. *Pedicularis recurva*, Maxim., in Mém. Biol. xii, p. 838, fig. 59, var. *polyantha*, Bonati.

Caules numerosi. Inflorescentia multiflora. Calycis dentes margine ciliati.

"Plant of 12-18 inches. Flowers deep crimson, apex of upper lobe white, spotted crimson."

"At the base of cliffs on the eastern flank of the Lichiang Range. Lat. 27° 25' N. Alt. 11-12,000 ft. August 1906." G. Forrest. No. 2667.

SECT. V. BIDENTATAE VERAЕ.

31. *Pedicularis hirtella*, Franch., in Journ. Linn. Soc. xxvi, p. 209.

"Plant of 9-14 inches. Flowers deep crimson. Grassy situations on the margins of cane brakes on the eastern flank

of the Lichiang Range. Lat.  $27^{\circ} 25' N.$  Alt. 11-12,000 ft. October 1906." G. Forrest. No. 3077.

# SECT. VI. BIDENTATAE VERTICILLATAE.

32. *Pedicularis comptoniaefolia*, Franch. ex Maxim., in Mél. Biol. x, p. 89; xii, p. 796.

"Mekong-Salwin divide, behind Tse Kou mission, Tibet. 1904." G. Forrest. No. 1136.

"Plant of  $1\frac{1}{2}$ -2 ft. Flowers deep rose. Dry, open situations amongst rocks on the eastern flank of the Lichiang Range. Lat.  $27^{\circ} 20' N.$  Alt. 10,000 ft. August 1906." G. Forrest. No. 2790.

"Plant of 1-3 ft. Flowers purplish-rose. Dry, stony situations amongst scrub at the base of cliffs on the eastern flank of the Tali Range. Lat.  $25^{\circ} 40' N.$  Alt. 9-10,000 ft. July 1906." G. Forrest. No. 4487.

33. *Pedicularis deltoidea*, Franch. ex Maxim., in Mél. Biol. xii, p. 791, fig. 7.

"Plant of 5-6 inches. Flowers rose. Moist pastureland along the base of the eastern flank of the Tali Range. Lat.  $25^{\circ} 40' N.$  Alt. 6700-8000 ft. May 1906." G. Forrest. No. 4490.

"Plant of 3-6 inches. Flowers bright carmine. Mossy, boggy situations on western slopes of Tsan Shan range near head of Yang-pi valley. Lat.  $25^{\circ} 40' N.$  September 1903." G. Forrest. No. 976.

34. *Pedicularis lutescens*, Franch. ex Maxim., in Mél. Biol. xii, p. 898.

"Plant of 6-9 inches. Flowers canary yellow. Stony, grassy slopes on the eastern flank of the Lichiang Range. Lat.  $27^{\circ} 20' N.$  Alt. 11-12,000 ft. September 1906." G. Forrest. No. 2937. This is more hairy than the following specimen.

"Plant of 5-8 inches. Flowers yellow. Open, mountain pastureland on the eastern flank of the Tali Range. Lat.  $25^{\circ} 40' N.$  Alt. 9-11,000 ft. June-July 1906." G. Forrest. No. 4494.

35. *Pedicularis rex*, Clarke ex Maxim., in Mél. Biol. xii, p. 875.

"Plants from 1-5 ft. Flowers yellow. In moist situations in most valleys. Alt. 6-11,000 ft. September 1904." G. Forrest. No. 1137.

"Moist, shady situations in and on the margins of pine and other forests on the eastern flank of the Lichiang Range.

Common all along base of flank. Lat.  $27^{\circ}$ – $27^{\circ}$   $30'$ . Alt. 8000–11,000 ft. June 1906. Specimen from alt. 10,000 ft." G. Forrest. No. 2477.

"Open situations in pine forests on the eastern flank of the Tali Range. Lat.  $25^{\circ}$   $40'$  N. Alt. 8–10,000 ft. June–August 1906." G. Forrest. No. 4502.

36. *Pedicularis superba*, Franch. ex Maxim., in Mél. Biol. xii, p. 874, fig. 102.

"Plant of 1–2 ft. Flowers bright rose. Shady, moist situations in and on the margins of pine forests on the eastern flank of the Lichiang Range. Lat.  $27^{\circ}$   $20'$  N. Alt. 10–12,000 ft. July 1906." G. Forrest. No. 3780.

#### SECT. VIII. ANODONTAE VERTICILLATAE.

37. *Pedicularis salviaeflora*, Franch., in Journ. Linn. Soc. xxvi, p. 215.

"Plant of 2–4 ft. Flowers, upper segment bright rose, lower, deep rose. In shady situations amongst scrub and grass at base of cliffs on the eastern flank of the Lichiang Range. Lat.  $27^{\circ}$   $15'$ . Alt. 9500–10,500 ft. August 1906." G. Forrest. No. 2789.

38. *Pedicularis densispica*, Franch. ex Maxim., in Mél. Biol. xii, p. 882, fig. 111.

"Plant of 6–12 inches. Flowers pink and crimson. Dry, stony situations in the Lichiang valley. Lat.  $27^{\circ}$  N. Alt. 8500 ft. May 1906." G. Forrest. No. 2061.

"Plant of 4–8 inches. Flowers rose-red and very pale pink. Dry, barren, rocky pastureland on the plain at the north end of the Lichiang valley. Lat.  $27^{\circ}$   $10'$  N. Alt. 9000. June 1906." G. Forrest. No. 2328.

"Plant of 1–2 ft. Flowers deep rose and pink. Grassy, rocky slopes on the eastern flank of the Lichiang Range. Lat.  $27^{\circ}$   $20'$  N. Alt. 10,500–12,000 ft. August 1906." G. Forrest. No. 2668.

"Plant of 9–16 inches. Flowers rose. Dry pastureland along the base of the eastern flank of the Tali Range. Lat.  $25^{\circ}$   $40'$ . Alt. 8–9000 ft. June 1906." G. Forrest. No. 4503.

39. *Pedicularis microchila*, Franch. ex Maxim., in Mél. Biol. xii, p. 884.

"Plant of 5–7 inches. Flowers pale rose. Mountain meadows on the eastern flank of the Tali Range. Lat.  $25^{\circ}$   $40'$  N. Alt. 9–10,000 ft. June 1906." G. Forrest. No. 4486.

40. *Pedicularis lineata*, Franch. ex Maxim., in Mél. Biol. xii, p. 887.

"Boggy pastureland by the sides of streams on the eastern flank of the Tali Range. Lat.  $25^{\circ} 40' N$ . Alt. 9000 ft. June 1906." G. Forrest. No. 4491, partly.

41. *Pedicularis rupicola*, Franch. ex Maxim., in Mél. Biol. xii, p. 890.

"Plant of 6-9 inches. Flowers rose-red. Open situations on limestone drift on the eastern flank of the Lichiang Range. Lat.  $27^{\circ} 20' N$ . Alt. 11-12,000 ft. August 1906." G. Forrest. No. 2859.

42. *Pedicularis likiangensis*, Franch. ex Maxim., in Mél. Biol. xii, p. 887.

"Flowers crimson. Marshy ground, margin of lake north of Chung Tien. Alt. 13,000 ft. N.-W. Yunnan, 1904." G. Forrest. No. 1138.

43. *Pedicularis szechuanica*, Maxim., in Mél. Biol. xii, p. 892.

"Plant of 6-14 inches. Flowers pale rose, veined a shade darker. Amongst heavy grass on the eastern flank of the Lichiang Range. Lat.  $27^{\circ} 20' N$ . Alt. 11-12,000 ft. July 1906." G. Forrest. No. 2594.

The total number of species of *Pedicularis* in this collection made by Mr. Forrest in the western parts of Yunnan is 43; of these 6 are new—*P. Margaritae*, *P. Balfouriana*, *P. Smithiana*, *P. Forrestiana*, *P. taliensis* and *P. Stadlmanniana*; the proportion of new species is 13, 9 per cent. of the whole. Further, 2 species (*P. siphonantha*, Don, and *P. szechuanica*, Maxim.) had not been recorded before from these regions so far as I am aware.

In comparing the results of Forrest's collections with those obtained before by Père Delavay, we note that the latter has collected at Tali and contiguous districts 48 species of *Pedicularis*. Out of these, *P. brevifolia*, Don, *P. integrifolia*, Hook. f., *P. lachnoglossa*, Hook. f., *P. longicaulis*, Franch., *P. macilentia*, Franch., *P. melampyrifolia*, Franch., *P. oligantha*, Franch., *P. rigida*, Franch., *P. rhodotricha*, Franch., *P. sigmoidea*, Franch., *P. strobilacea*, Franch., *P. villosula*, Franch., are not represented in the collection of Mr. Forrest described above. The total number of species indigenous in that part of Yunnan is, or seems to be at present, 56. Out of these, 32 species have not been recorded so far anywhere else.

## LIST OF PLATES.

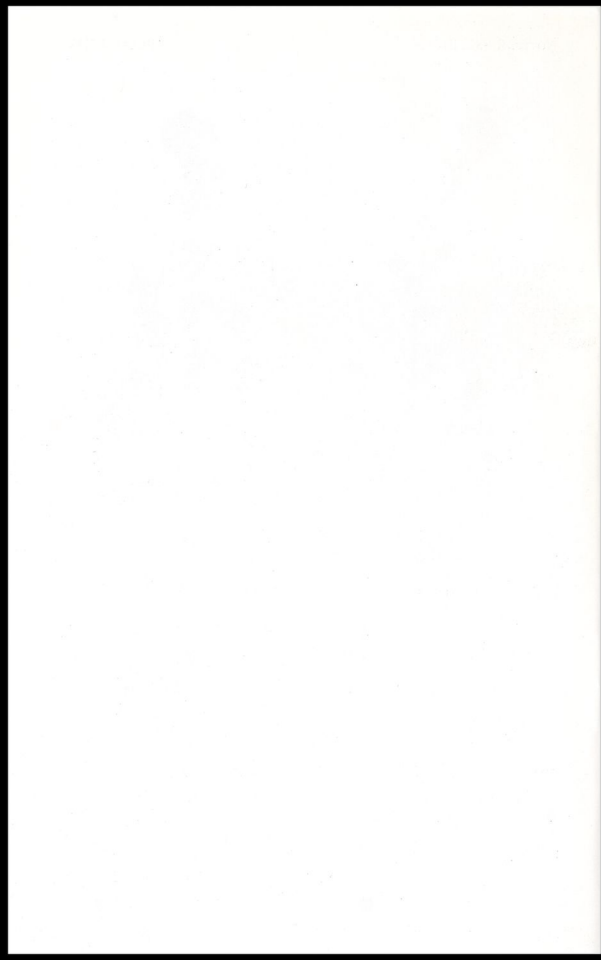
Illustrating M. Gustave Bonati's Paper on Species of *Pedicularis* collected by  
George Forrest in Yunnan and Eastern Tibet.

- PLATE LXX. *Pedicularis Margaritae*, Bonati. Sp. nov.  
LXXI. *Pedicularis Balfouriana*, Bonati. Sp. nov.  
LXXII. *Pedicularis Smithiana*, Bonati. Sp. nov.  
LXXIII. *Pedicularis Forrestiana*, Bonati. Sp. nov.  
LXXIV. *Pedicularis taliensis*, Bonati. Sp. nov.  
LXXV. *Pedicularis Stadlmanniana*, Bonati. Sp. nov.





*Pedicularis Margaritae, Bonati.*





PLANTS OF E. TIBET AND S.W. CHINA.

COLLECTED BY GEORGE FORREST.

COLLECTED FOR A. E. BULLY OF HESS, WESTON, CHESHIRE.

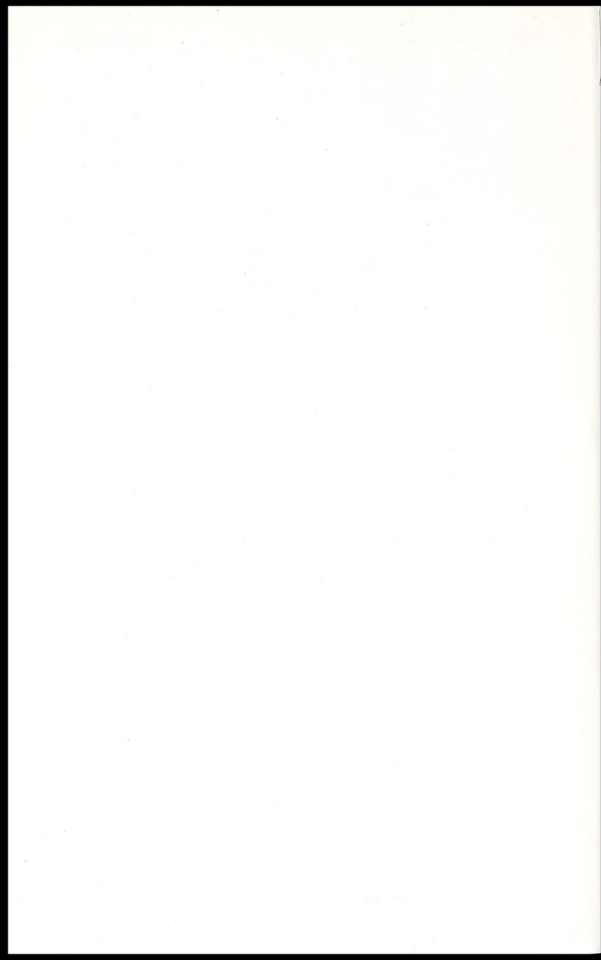
No. 4420.

Plants of 6-8 inches. Flowers greenish-white.  
Open, stony pastureland on the eastern flank of the Tali Range.

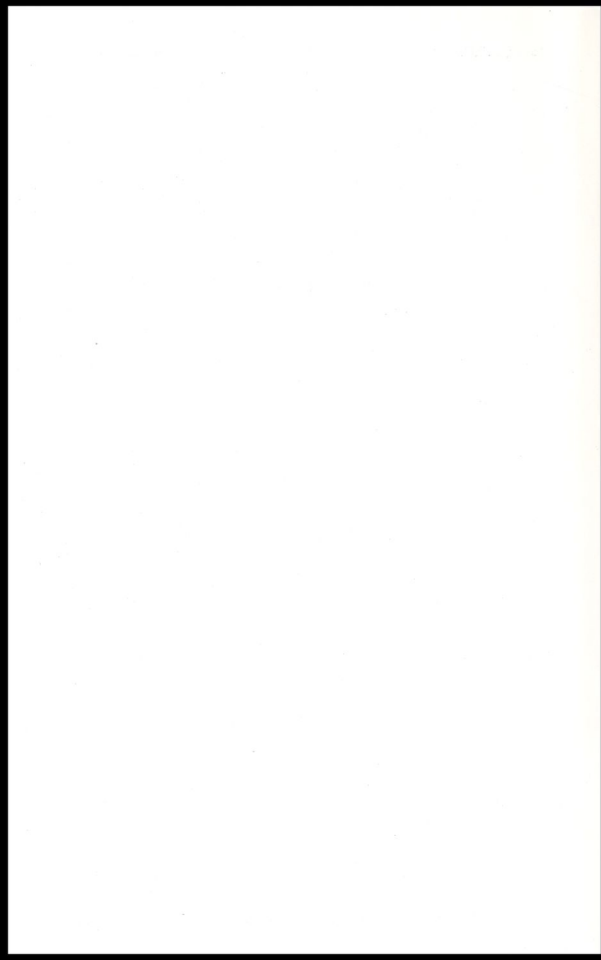
Loc. 2-600' N. Alt. 8-10000 ft.  
June 1908. W. Kuhn, China.

*Pedicularis Balfouriana* n.

det. Bonati.









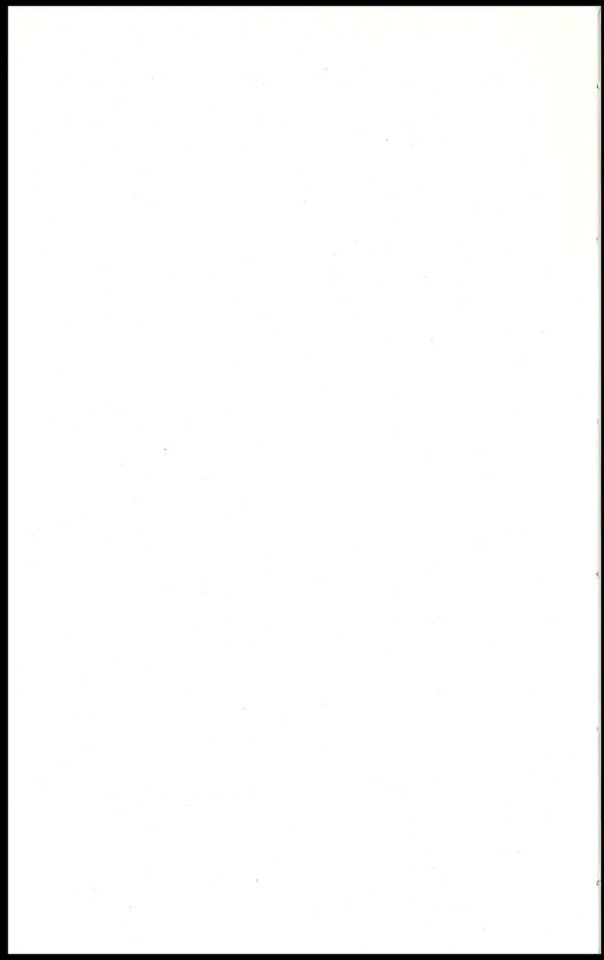


PLANTS OF E. TUCKER AND R.B. EDIN.  
 A. BONATI, 1890.  
 GARDEN OF THE U.S. DEPT. OF AGRICULTURE, WASHINGTON, D.C.

*Pedicularis forrestiana* W.

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*Pedicularis Forrestiana, Bonati.*





*Pedicularis taliensis*, Bonati.



*Pedicularis Hadlmanniana*

